Problem 27.14

The resistance of a wire is proportional to the length of the wire (the longer the wire, the more the resistance), inversely proportional to the cross-sectional area of the wire (the smaller the area, the bigger the resistance to current flow) with a proportionality constant equal to the material's resistivity. The resistivity is found in a table in the book. Doing the math, we get:

$$R = \rho \frac{L}{A}$$
$$= \left(5.6\text{x}10^{-8}\ \Omega \bullet \text{m}\right) \frac{\left(1.5\ \text{m}\right)}{\left(.6\text{x}10^{-6}\ \text{m}^2\right)}$$
$$= 1.4\text{x}10^{-1}\ \Omega$$

The current is:

$$i = \frac{V_R}{R}$$
$$= \frac{\left(.9\ \text{V}\right)}{\left(1.4\text{x}10^{-1}\ \Omega\right)}$$
$$= 6.43\ \text{amps}$$